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U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON, D.C.

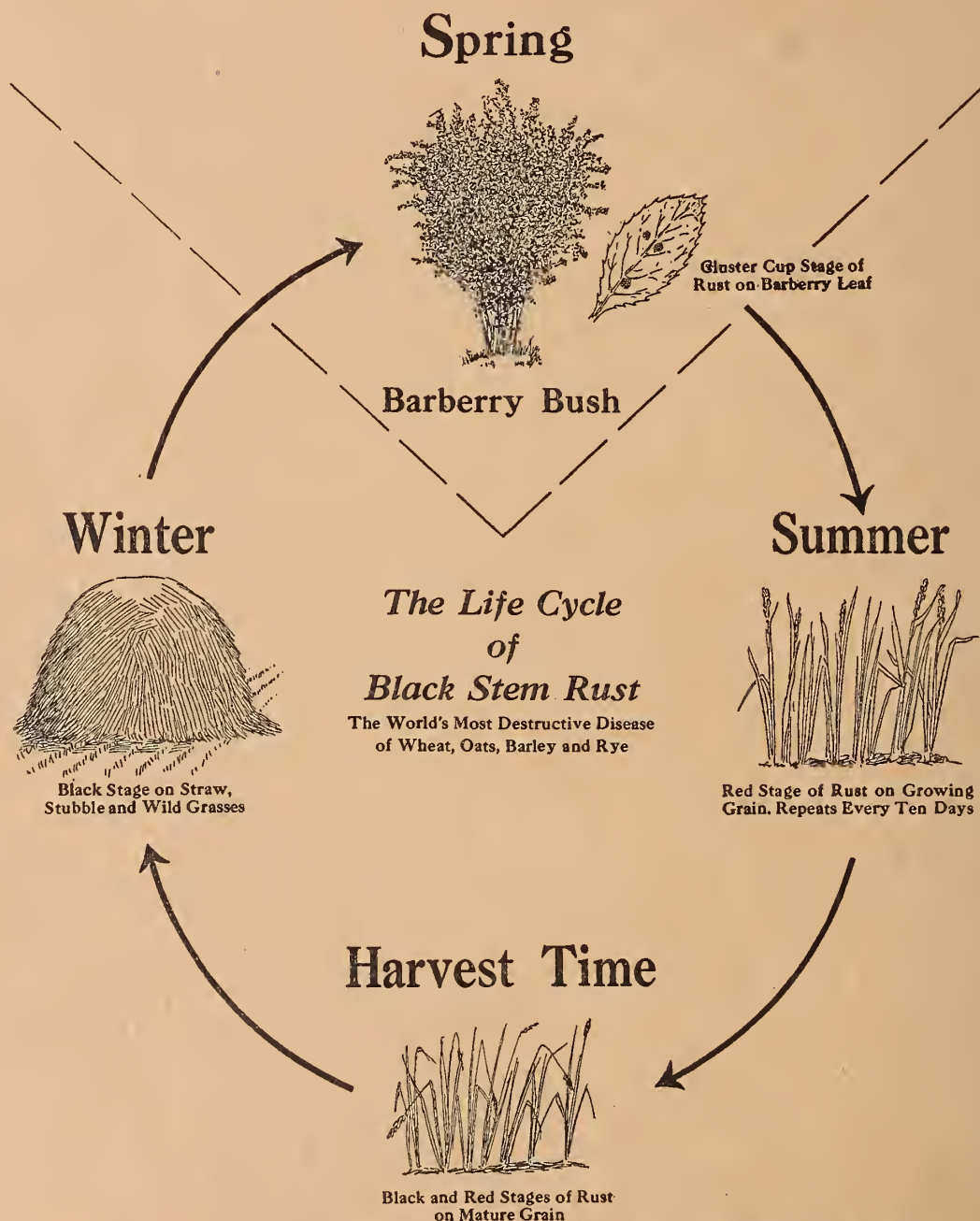
PROGRESS
of the
Barberry Eradication
Campaign
in
ILLINOIS in 1929



Our Grain Crops Must Be Protected from Black Stem Rust

Barberry Eradication Pays

Remove the Barberry and Break the Rust Cycle



All Common Barberries act as starting points for Black Stem Rust early each spring. By destroying the barberry the early spring source of black stem rust is eliminated. The Common Barberry provides a means to bridge the gap between the black stage on grain in the fall and the red stage of the rust on grains and grasses the following spring.

BOOST BARBERRY ERADICATION—A PRACTICAL RUST CONTROL MEASURE

PROGRESS OF BARBERRY-ERADICATION CAMPAIGN

IN ILLINOIS, 1929

By W. L. Popham, Agent 1/

Office of Barberry Eradication 2/, Bureau of Plant Industry,

United States Department of Agriculture

The United States produced approximately 320,000,000 bushels of spring wheat in 1929. More than three-fourths of this quantity, or 275,000,000 bushels, was grown in 13 of the upper Mississippi Valley States. These States, namely, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming, cooperate with the United States Department of Agriculture in conducting the barberry-eradication campaign. This area is directly concerned with the control of black stem rust, and the common barberry (Berberis vulgaris L.) is the only alternate host for the parasite causing stem rust of wheat, oats, barley, rye, and many of the native grasses.

Barberry Eradication a Means of Reducing Losses from Stem Rust

The eradication of the common barberry was recommended by plant pathologists as a means of reducing losses from black stem rust following the severe epidemic in 1916. In that year, spring-wheat losses caused by stem rust in the principal spring-wheat States amounted to more than 180,000,000 bushels. This fungous disease became recognized as the most serious pest with which the spring-grain producers had to contend.

Continuous investigation since stem rust first became a disease of economic importance has established evidence that the common barberry is the most important factor contributing to losses from stem rust. The removal of all barberry bushes in the barberry-eradication area will mean a marked delay in the development of stem rust, as the spores which spread the disease can not survive the effects of alternate freezing and thawing. It also has been definitely established within the past year that new strains of stem rust are produced on barberry leaves as a result of the cross-breeding of two different forms of the rust. This cross-breeding can take place only on barberry leaves, which means that the eradication of the common barberry not only will remove the local sources for stem rust but will prevent the possibility of the creation of new strains each time a barberry bush becomes infected with the disease.

1/ Acting State Leader of barberry eradication in Illinois.

2/ From the beginning of the campaign in 1918 until January 1, 1930, barberry eradication was a project of the Office of Cereal Crops and Diseases, of the Bureau of Plant Industry. On January 1, 1930, the Office of Barberry Eradication was established as a separate unit of the Bureau.

The black or winter stage of the rust, which lives through the winter on old straw and stubble, can not infect grain in the spring without first attacking the common barberry, then spreading from it to the growing crop. The normal spread of rust from the south, where the red or repeating stage of stem rust lives throughout the year, ordinarily will not be a serious factor, judging by results obtained from investigations conducted along this line since 1916. The evidence accumulated in 11 years of investigation in connection with the barberry-eradication campaign indicates that losses from stem rust will be gradually reduced as many of the remaining barberry bushes are eliminated.

Organization, Personnel, and Financing of Eradication Program

Organization

The barberry-eradication campaign was organized in 1918 as a result of the combined efforts of the United States Department of Agriculture, the State departments of agriculture, and the State colleges, to find a practical means of reducing losses from stem rust in the principal grain-producing States of the upper Mississippi Valley. The Conference for Prevention of Grain Rust of Minneapolis, an independent organization of men interested in the production of high quality small grains, has given valuable assistance in this difficult undertaking. It has distributed much educational material to property owners and school children within the barberry-eradication area.

Personnel

There is a State Leader, or supervisor of field activities, in each of the 13 States. The Illinois State Leader has his headquarters in the Post Office Building at Urbana. A number of field agents are employed for five or six months in the summer under the supervision of the State Leader in the survey for common barberry bushes. When making his selection the State Leader gives particular attention to the applicant's general knowledge of agriculture and the scientific principles involved in the control of black stem rust. Personality, physical fitness, and general adaptability for field work also are considered. The field agents are given a special course of instruction in the methods of barberry eradication and in the proper way to handle inquiries pertaining to other lines of agriculture.

Financing

The barberry-eradication campaign is financed mainly by the United States Department of Agriculture. The Federal appropriation, however, is supplemented by direct and indirect aid from the individual States and the Conference for Prevention of Grain Rust.

BLACK STEM RUST SPREADS FROM COMMON BARBERRIES



to Wheat, Oats, Barley, Rye and other Grasses.

Black Stem Rust as it appears on the leaves of the Common Barberry



Enlarged single leaf



Plump healthy grain



Shriveled rusted grain

DANGEROUS NEIGHBORS

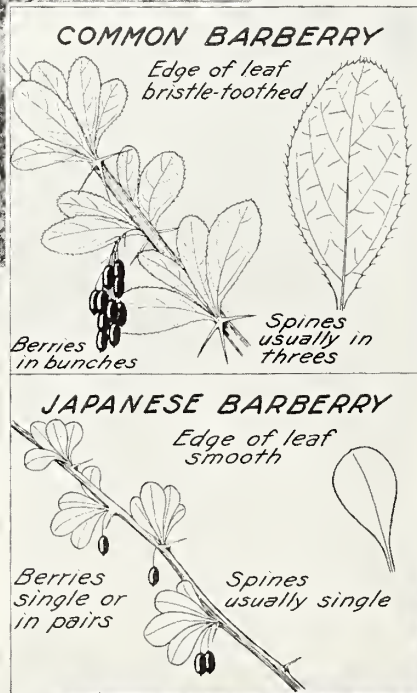


Common Barberry Bushes growing near grain fields

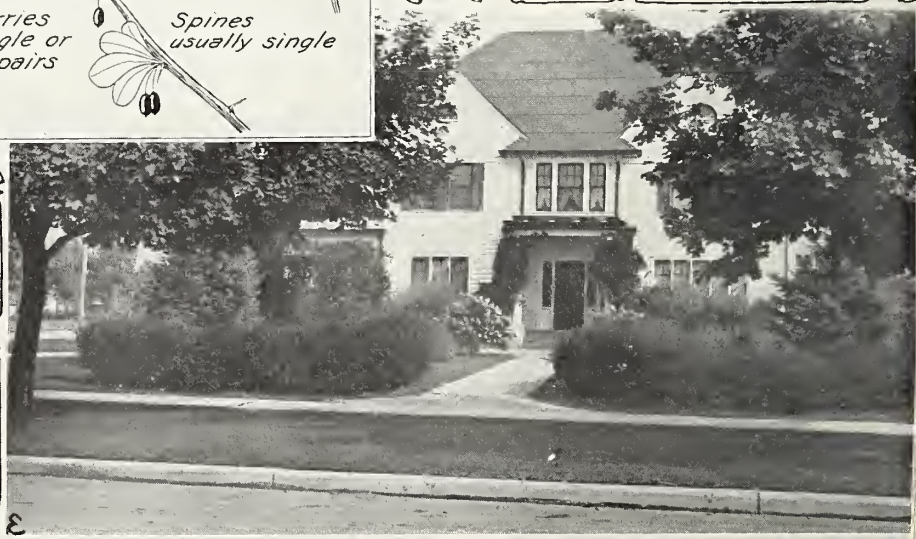
Report Common Barberry bushes you may find to your State Leader of Barberry Eradication.



Common Barberry is harmful, destroy



Japanese Barberry is harmless do not destroy



Progress of Field Activities

Survey

In 1929, 1,017 common barberry bushes and 357 seedlings were located and destroyed in Illinois. These, added to the number of bushes and seedlings found prior to 1929, make a grand total of 337,625 bushes and 2,176,217 seedlings destroyed since the beginning of the campaign in Illinois. This enormous number of bushes and seedlings already located and destroyed indicates somewhat the difficult task undertaken by the United States Department of Agriculture in ridding this State of the alternate host plant for stem rust.

The survey activities of the past year were conducted in Monroe, Randolph, Perry, Washington, Wabash, Wayne, Edwards, Jefferson, White, and Hamilton Counties. Some very intensive second survey work also was conducted in Jo Daviess County in northern Illinois. The map accompanying this report will show that in this county many bushes have been destroyed, most of which had escaped cultivation, having developed from seed scattered by birds or other agencies.

In southern Illinois common barberry bushes are not so numerous, and the task of complete eradication probably will not be difficult. In the northern counties of the State, however, the many escaped bushes, together with the enormous number of seedlings found growing in out-of-the-way places, will require more than one intensive survey.

Publicity and Education

The ultimate success of the program to control black stem rust of small grains in Illinois depends largely upon the efficiency of the survey and the cooperation of property owners. Many have given valuable aid to the field agents upon becoming acquainted with the purpose of the campaign. To better acquaint the public with the relation existing between the common barberry and stem rust, and incidentally to enlist more support from property owners, an extensive educational program is conducted each year at about the time of the field survey.

In 1929 considerable attention was given to the preparation of window displays and demonstrations at State and county fairs as means of bringing before the public facts concerning the progress of the campaign. The newspapers of the State have cooperated by informing the community of the progress of the survey and the results obtained. News stories prepared and sent out by the editor of the Illinois Agricultural College have proved especially helpful in disseminating general information about the campaign to all newspapers in the State interested in agricultural problems.

The principal educational program of 1929, however, was conducted in connection with the public schools. Four separate projects were carried on in different parts of the State, each being planned to create interest among pupils

in the methods of controlling stem rust. In January and February letters addressed to teachers of science or agriculture were sent to 61 high schools in 22 counties informing them that study materials and a lantern-slide lecture on the subject of black stem-rust control were available for their use. This letter was followed by a speaker who talked at 51 of these high schools. He was heard by more than 5,000 pupils, 300 teachers, and a number of persons who visited the schools in order to hear the lecture.

The Rust Busters' Club was organized in the fall in four counties of northern Illinois. In his talk before assemblies of grade-school children the speaker outlined the requirements for membership in the Club and displayed the badges and medals offered by the Conference for Prevention of Grain Rust to pupils qualified for membership in the Club by reporting the location of common barberry bushes. There are now 21 members in the Illinois Club, which means that 21 pupils have reported the location of common barberry bushes within their communities, each member having reported a different location and sent a twig from one of the bushes to the State Leader's office for positive identification.

The Essay Contest, conducted in DuPage and Kendall Counties in northern Illinois, proved a very effective means of interesting rural school pupils in the control of stem rust. The contest also was sponsored by the Conference for Prevention of Grain Rust, and suitable prizes were given for the best essay in each county and to the best in the entire district. All essays were on the subject of stem-rust control.

In addition to these activities an extensive program was conducted in 22 counties in southern Illinois where survey was to follow within a short time. Letters from the County Superintendent of Schools and the State Leader, together with suitable supplementary materials for preparing a lesson on stem-rust control, were mailed to all seventh and eighth grade teachers in these counties. This educational program proved very effective in arousing the interest of the pupils in the survey to follow in the summer.

Stem Rust in Illinois - 1929

Losses

The damage from black stem rust in Illinois in 1929 was very slight. Some infection occurred in spring wheat and oats, but it appeared late in the season after most of the grain was too near maturity to be injured. The official estimates of the loss from rust for the past year are as follows: Wheat, 0.5%; oats, 0.7%; rye, 0; barley, 0.

As long as barberry bushes remain in Illinois there will be some stem rust, which will injure grain in varying degrees, depending on climatic conditions. There always will be danger of serious grain losses in seasons of favorable moisture and temperature conditions. When the common barberry is destroyed there will be no local host plant for the rust, and the probability of rust spreads occurring early enough to do serious damage will be very slight.



FLOWERS
(yellow)



BERRIES
(bright red)

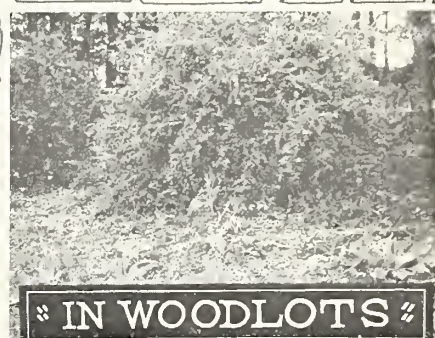
Where Barberry Bushes Grow



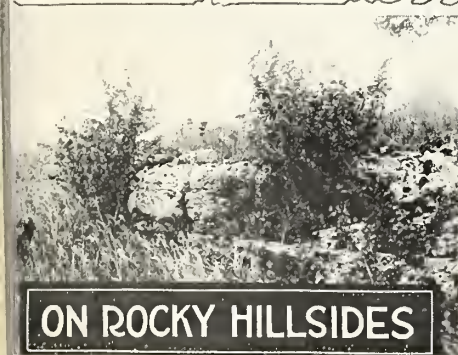
IN DOORYARDS



BIRDS CARRY BARBERRY SEEDS SEVERAL MILES, DROPPING THEM AMONG ROCKS AND IN OUT-OF-THE-WAY PLACES



IN WOODLOTS



ON ROCKY HILLSIDES



Barberries spread by birds



AS HEDGE FENCES



UNDER OTHER SHRUBS and TREES





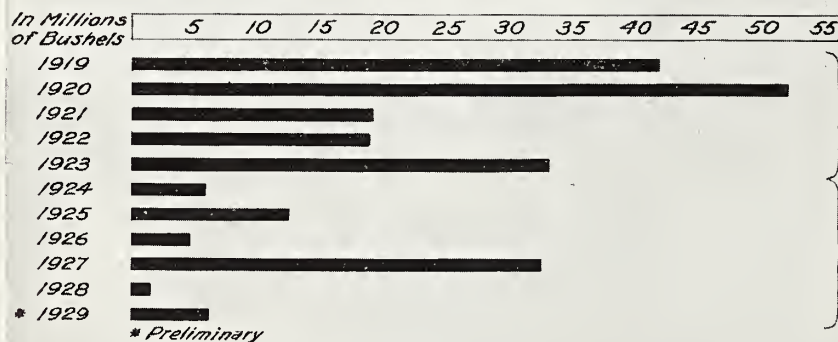
Salting a bush



Sprouts from a dug bush

Common Salt Kills Barberry Bushes and Prevents Sprouting

Wheat Losses in Barberry Eradication Area, 1919-1929



The average annual loss for the first five year period, 1919 to 1923, was approximately 33,000,000 bushels.

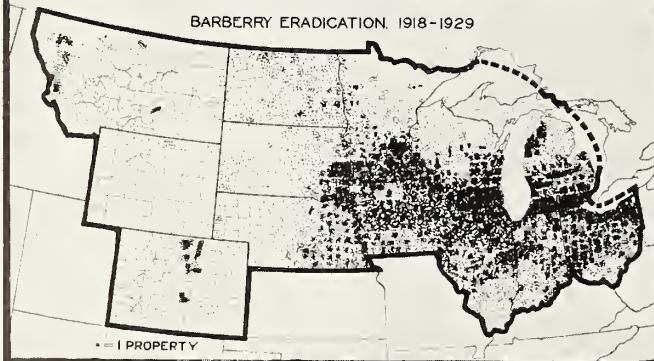
The average annual loss for the next six year period, 1924 to 1929, was approximately 10,500,000 bushels.

The losses to small grain crops caused by black stem rust have been reduced since the beginning of the barberry eradication campaign in 1918. The breeding of rust-resistant varieties, the use of early maturing varieties, and the sowing of crops early, have aided barberry eradication in this reduction.

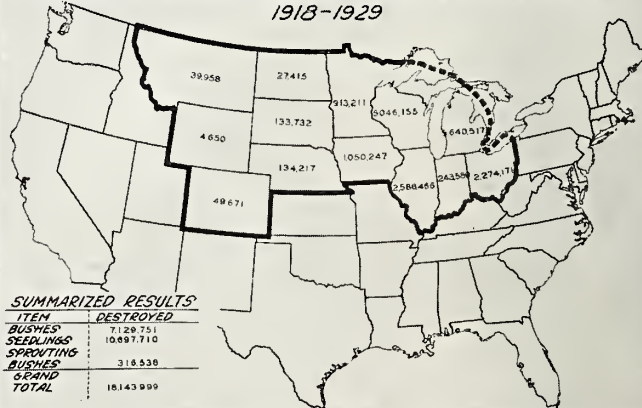
"BARBERRY ERADICATION PAYS"

RURAL PROPERTIES ON WHICH BARBERRY BUSHES WERE FOUND-ALL SURVEYS

BARBERRY ERADICATION, 1918-1929



NUMBERS OF BARBERRY BUSHES AND SEEDLINGS DESTROYED 1918-1929



SUMMARIZED RESULTS	
ITEM	DESTROYED
BUSHES	7,129,751
SEEDLINGS	10,691,710
SPROUTING BUSHES	316,538
TOTAL	18,143,999

Prepared by the Rust Prevention Association, 300 Lewis Building, Minneapolis, Minn., in co-operation with Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C.

Methods of Black Stem Rust Control

There are other methods besides barberry eradication for reducing stem-rust losses. Early seeding of spring grain on a well-prepared seed bed will hasten maturity of the crop and often prevent losses. The selection of varieties least susceptible to stem rust will tend to avoid serious losses until the sources of the rust in each county or in each State are located and removed. New varieties of spring grain possessing rust-resistant qualities are being developed by plant breeders and in some localities are playing an important part in the reduction of stem-rust losses.

New Strains of Destructive Stem Rust

Develop on the Common Barberry

The production of rust-resistant varieties of grains probably will be much more successful, however, when all common barberry bushes have been eradicated. The reason for this is shown in the recent important discoveries made in the Canadian Rust Research Laboratories at Winnipeg and by Dr. E. C. Stakman and his coworkers at the University of Minnesota. Both of these groups conducting independent research have proved that entirely new strains of stem rust are produced if two different forms cross-breed on barberry leaves. The certainty that new forms of the dangerous disease may appear suddenly, makes the eradication of the common barberry all the more imperative, since it is on the barberry alone that this crossing can occur in nature. The new and apparently resistant varieties of grains are not safe with barberries near. If for no other reason than to protect the new kinds of superwheat which are now in the process of being developed, all common barberry bushes should be destroyed.

Summary

1. The objects of the barberry-eradication campaign in Illinois are (1) to locate and destroy all common barberry bushes in the State, and (2) to inform property owners about the bush and its part in the dissemination of stem rust, so that they may destroy any bushes that have been overlooked by the field agents or that have developed from seed since the survey was made.

2. The field agents employed have had special training in plant-disease control methods and before going into the field, are given special instruction in efficient methods of conducting a survey for barberry bushes.

3. Since the beginning of the campaign, 2,563,842 common barberry bushes and seedlings and 22,624 sprouting bushes have been destroyed in Illinois. The problem of complete eradication probably will be much more difficult in northern Illinois than in the southern part of the State because of the many escaped bushes and the enormous number of seedlings that are being found in the northern counties.

4. The purpose of the extensive educational program in connection with the actual survey work is to acquaint property owners with the facts about the

control of stem rust and to enlist their support of the Government agents working in their community.

5. Chemical eradication has proved far more satisfactory than the old method of digging. All common barberry bushes found in Illinois are killed with crushed rock salt or kerosene if there is no danger of injuring other valuable shrubbery or trees growing near by.

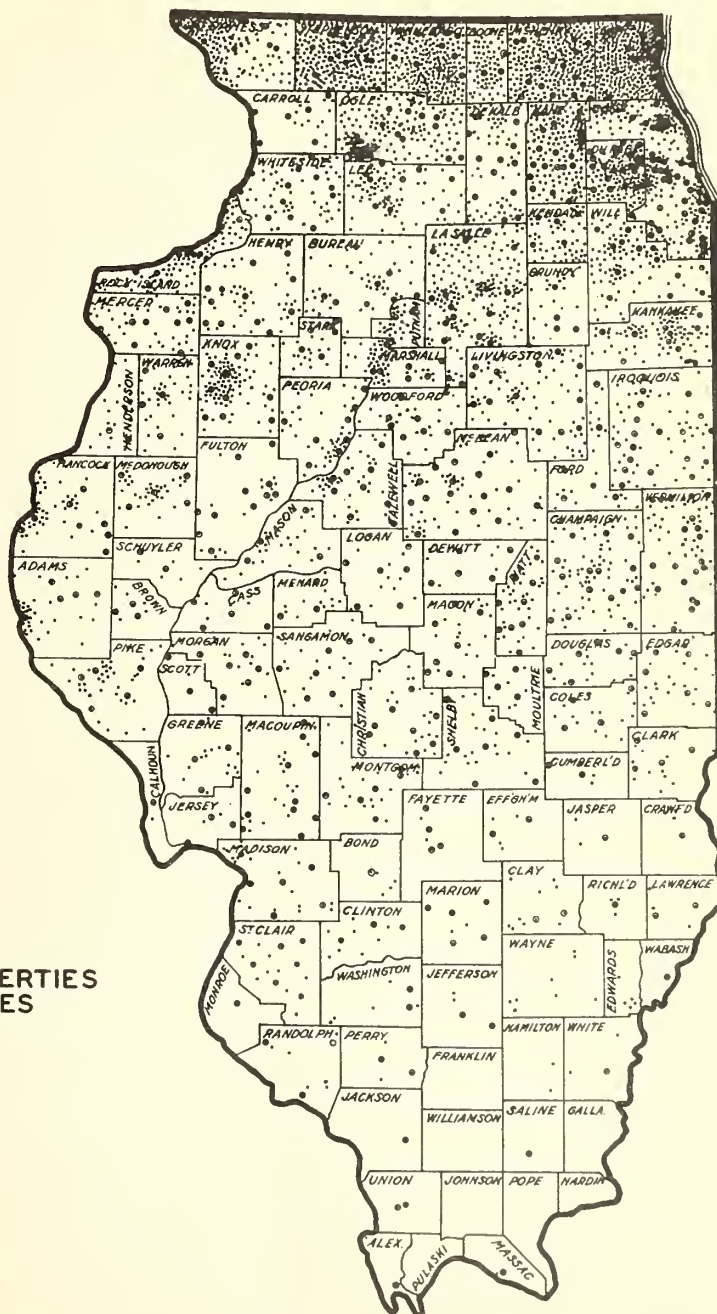
6. Figures compiled by the United States Department of Agriculture and the Conference for Prevention of Grain Rust indicate that the average annual losses from stem rust are readily decreasing as the many thousands of barberry bushes are removed from the barberry-eradication area each year.

7. Factors important in the control of stem rust are: (1) The removal of the alternate host of the rust by the eradication of the common barberry; (2) the early seeding of spring grain on a well-prepared seed bed; and (3) the selection of small-grain varieties least susceptible to stem rust.

Washington, D. C.,
March 1, 1930.

PROPERTIES HAVING BARBERRY BUSHES 1918-1929

ILLINOIS



15,036 PROPERTIES
2,586,466 BUSHES

- FARMS HAVING BARBERRY BUSHES
- TOWNS HAVING BARBERRY BUSHES

REPORTS HAVING BARBERY BUSINESSES (1910-1911)

ALABAMA



RECEIVED
JAN 1 1912

REPORTS HAVING BARBERY BUSINESSES (1910-1911)

Common Barberry Spreads Black Stem Rust

*When you find
a spiny bush
with-*

*Edges of leaves
like this*



Spines like these



Berries like these



Inner bark yellow



*It is a
Common Barberry
and should be
reported at once*

**Know
Common
Barberry
Look For It!**

*Spread of
Barberries by
birds*

*Birds eat the
berries*



*Carry them to their
roosting places*



*Where they cough
up the seeds*



*From which seedling
bushes grow*



*They in time
bear fruit which
is again carried
farther on*

Look For and Report All Common Barberry Bushes

To the State Leader of Barberry Eradication, in care of your State Department of Agriculture or your State Agricultural College.

Common Barberry Bushes

spread

Black Stem Rust

to

WHEAT, OATS,
BARLEY, RYE,
and Many Wild
Grasses

THIS Progress Report is prepared and printed by the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. The cover is furnished by the Conference for the Prevention of Grain Rust, 300 Lewis Building, Minneapolis, Minnesota.